

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. **(Currently Amended)** A transceiver comprising:
 - a signal power source adapted to produce a physical layer signal for transmission across a physical link
 - a high-speed data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate a physical layer signal with a high-speed data signal received from the high-speed data modulator; ~~and~~
 - an out-of-band data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate the physical layer signal in response to out-of-band data received from the out-of-band data modulator wherein modulation by the high-speed data modulator and out-of-band data modulator produces an outgoing double modulated signal including high-speed data and out-of-band data; and
 - a controller configured to generate diagnostic information regarding the transceiver and/or to receive diagnostic information from a host device coupled to the transceiver over a standard bus, the controller further configured to provide the diagnostic information to the out-of-band modulator to be modulated as at least some of the out-of band data.

2. **(Original)** The transceiver of claim 1, wherein:
 - the transceiver is an optical transceiver;
 - the signal power source comprises a laser driver and laser; and

the transceiver further comprises an average power bias circuit configured to control the average power output by the laser, wherein the out-of-band data modulator is coupled to the average power bias circuit.

3. **(Original)** The transceiver of claim 1, wherein:
the transceiver is an optical transceiver;
the signal power source comprises a laser driver and laser; and
the laser driver further comprises an extinction ratio command input configured to control the extinction ratio of a signal output by the laser, wherein the out-of-band data modulator is coupled to the extinction ratio command input.

4. **(Original)** The transceiver of claim 1, wherein:
the transceiver is an optical transceiver;
the signal power source comprises a laser driver and laser;
the transceiver further comprises an average power bias circuit configured to control the average power output by the laser, wherein the out-of-band data modulator is coupled to the average power bias circuit; and
the laser driver further comprises an extinction ratio command input configured to control the extinction ratio of a signal output by the laser, wherein the out-of-band data modulator is coupled to the extinction ratio command input.

5. **(Original)** The transceiver of claim 1, wherein:
the transceiver is an optical transceiver;
the signal power source comprises a laser driver and laser; and
the laser driver further comprises high-speed data 1 level command that defines the power output by the laser when a high-speed data 1 is output, wherein the out-of-band data modulator is coupled to the high-speed data 1 level command.

6. **(Original)** The transceiver of claim 1, wherein the out-of-band modulator is configured to modulate using at least one of phase shift keying, binary phase shift keying, quadrature phase shift keying, and Manchester encoding.

7. **(Original)** The transceiver of claim 1, wherein the out-of-band data modulator is configured to modulate identification and authentication information.

8. **(Original)** The transceiver of claim 1, wherein the out-of-band data modulator is configured to modulate diagnostic information including the health of the transceiver.

9. **(Original)** The transceiver of claim 1, wherein the out-of-band data modulator is configured to modulate configuration data.

10. **(Original)** The transceiver of claim 1 further comprising:

a signal reception element configured to receive physical layer signals from a physical link and to produce an incoming double modulated signal from the physical layer signal;

an out-of-band detector that is coupled to the signal reception element and is configured to extract out-of-band data from the incoming double modulated signal;

a high-speed data amplifier that is coupled to the signal reception element and is configured to extract high-speed data from the incoming double modulated signal.

11. **(Original)** The transceiver of claim 10, wherein the out-of-band detector comprises an IR receiver. .

12. **(Currently Amended)** In an environment including an optical transceiver in communication with a remote optical transceiver and in communication with a host device, [[A]] a method of transmitting data on a physical link comprising:

modulating, at the optical transceiver, a data signal with high-speed data, wherein the optical transceiver transmits high-speed data to the host device over a high-speed data interface;

modulating, at the optical transceiver, the data signal with out-of-band data wherein modulating the data signal with high-speed data and out-of-band data creates an outgoing double modulated signal that is a physical layer signal for transmission on a physical link, wherein the out-of-band data is data transmitted by the transceiver over the high speed data interface to the remote transceiver for the use of the transceiver and the remote transceiver in diagnostic operations and wherein out-of band data is transmitted by the transceiver to the host device over a low speed data interface;

transmitting, at the optical transceiver, the double modulated signal onto the physical link.

13. **(Original)** The method of claim 12, wherein modulating the modulated data signal comprises varying the average power the physical layer signal.

14. **(Original)** The method of claim 12, wherein modulating the modulated data signal comprises varying the peak power of the physical layer signal.

15. **(Original)** The method of claim 12, wherein modulating the modulated data signal comprises varying the extinction ratio of the physical layer signal.

16. **(Original)** The method of claim 12, further comprising:

receiving an incoming double modulated signal that includes high-speed and out-of-band data;

extracting high-speed data from the incoming double modulated signal; and

extracting out-of-band data from the incoming double modulated signal.

17. **(Original)** The method of claim 16, wherein extracting out-of-band data from the incoming double modulated signal comprises measuring average power of the incoming double modulated signal.

18. **(Original)** The method of claim 16, wherein extracting out-of-band data from the incoming double modulated signal comprises measuring peak power of the incoming double modulated signal.

19. **(Original)** The method of claim 16, wherein extracting out-of-band data from the incoming double modulated signal comprises measuring the extinction ratio of the incoming double modulated signal.

20. **(Original)** The method of claim 12, wherein modulating the modulated data signal comprises modulating the modulated data signal according to at least one of phase shift keying, binary phase shift keying, quadrature phase shift keying, and Manchester encoding.

21. **(Currently Amended)** A repeater for receiving and retransmitting digital data, the repeater comprising:

a receiver adapted to receive a data signal;

a signal processor coupled to the receiver, the signal processor being adapted to perform processing tasks on the data signal;

a transmitter coupled to the signal processor, the transmitter adapted to receive the data signal from the processor and to transmit the data signal; and

out-of-band logic coupled to the signal processor, the out-of-band logic configured to extract and insert out-of-band data onto the data signal, wherein the out-of-band logic is configured to:

extract out-of-band data from the data signal, wherein the out-of-band data includes digital diagnostic data from at least one remote repeater;

concatenate data corresponding to digital diagnostic data for the repeater to the out-of-band data such that the out-of-band data includes the digital diagnostic data for the repeater and the at least one remote repeater; and

insert the out-of-band data including the data corresponding to digital diagnostic data for the repeater and the at least one remote repeater onto the data signal.

22. **Canceled**

23. **(Original)** The repeater of claim 21, wherein the out-of-band logic is a microprocessor.

24. **(New)** A transceiver comprising:

a signal power source adapted to produce a physical layer signal for transmission across a physical link

a high-speed data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate a physical layer signal with a high-speed data signal received from the high-speed data modulator;

an out-of-band data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate the physical layer signal in response to out-of-band data received from the out-of-band data modulator wherein modulation by the high-speed data modulator and out-of-band data modulator produces an outgoing double modulated signal including high-speed data and out-of-band data; and

an average bias circuit configured to control the average output by the signal power source, wherein the out-of-band data modulator is coupled to the average power bias circuit,

the average power bias circuit comprising:

an amplifier having a first input configured to receive an average power command and a second input configured to receive the out-of-band data;

a transistor having a first node coupled to the amplifier, wherein the amplifier controls the operation of the transistor, and a second node coupled to the signal power source.

25. **(New)** A transceiver comprising:

a signal power source adapted to produce a physical layer signal for transmission across a physical link

a high-speed data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate a physical layer signal with a high-speed data signal received from the high-speed data modulator;

an out-of-band data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate the physical layer signal in response to out-of-band data received from the out-of-band data modulator wherein modulation by

the high-speed data modulator and out-of-band data modulator produces an outgoing double modulated signal including high-speed data and out-of-band data; and

the signal power source comprises a laser driver and a laser;

wherein the laser driver further comprises an extinction ratio command input configured to control the extinction ratio of a signal output by the laser, wherein the out-of-band data modulator is coupled to the extinction ratio command input,

the laser driver comprising:

a first node coupled to a mixer, wherein the mixer is configured to receive the extinction ratio command input and is configured to receive the out-of-band data;

a second node configured to receive high-speed data; and

a third node coupled to the laser.